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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,399	07/27/2006	Tim Popken	288789US0PCT	7175

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

ZIMMER, ANTHONY J

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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10/21/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/587,399	Applicant(s) POPKEN ET AL.	
	Examiner ANTHONY J. ZIMMER	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :7/21/2008, 6/26/2008, 4/30/2008, 4/17/2008, 5/21/2007, 10/24/2006.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I in the reply filed on 9/15/2008 is acknowledged. The traversal is on the ground(s) that the groups are not patentably distinct and that there is no burden on the examiner. This is not found persuasive because the arguments are drawn to restriction practice pertinent to applications filed under 35 U.S.C. 111(a); however, the instant application is a national stage application filed under 35 U.S.C. 371 to which the unity of invention standard under PCT Rules 13.1 and 13.2 is applied. See MPEP 1893.03(d). Thus, the arguments are irrelevant, and the groups are held to lack unity as detailed in the Restriction Requirement of 8/13/2008.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-3 and 9 recite the limitation "the gas mixture." There are insufficient antecedent bases for this limitation in the claims.

Dependent claims (of claim 1) are rendered indefinite as a result.

Claim 4 recites the limitation "the partial condensation" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the dismutation" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 5 recites the limitation "the range" in the second and third line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "the silane-containing feed mixture" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the silane-containing feed mixture" in the third line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the silane-containing feed mixture." There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Japan 2001-064774.

In regard to claim 1, JP'774 teaches a process for producing high-purity silicon by decomposing a mixture of monosilane and monochlorosilane gases using heat/plasma (i.e. a thermal decomposition in the gas phase) and deposition on a substrate. See Derwent and Japanese abstracts of JP'774.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-4 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 2001-064774.

In regard to claim 2, JP'774 teaches a range of molar ratio of monosilane to monochlorosilane of 1:99 to 95:5. Overlapping ranges are *prima facie* obviousness. See MPEP 2144.05.

In regard to claim 3, JP'774 teaches that the reactive gas mixture can further comprise dichlorosilane or trichlorosilane. See [0021] of the provided machine translation.

In regard to claim 4, JP'774 teaches that the gas mixture can be obtained from trichlorosilane as required by the claim. See [0031]-[0034]. Furthermore, this process is well known as admitted by applicant spanning instant pages 3-4.

In regard to claim 7, JP'774 does not mention the process being continuous; however, making a batch process continuous would have been obvious to one of ordinary skill in the art. See MPEP 2144.04 Section V.

In regard to claim 8, JP'774 teaches storing the gas mixture in a cylinder as a gas or liquid (that is connected to the decomposition/deposition apparatus). See [0025].

In regard to claim 9, JP'774 teaches that hydrogen, nitrogen, or argon (a noble gas) can be included in the reaction gas. Though JP'774 is silent in regard to mixing these gasses with the silanes prior to introduction to the decomposition/deposition apparatus; it would have been obvious for one of ordinary skill in the art to do so as JP'774 mentions that these gasses may be contained in the "raw material," see [0021], (i.e. the mixture of reaction gasses before introduction into the reaction chamber) and thus it would have been obvious to one of ordinary skill in the art to mix the hydrogen, nitrogen, or argon with the silanes in order to achieve such a "raw material" mixture.

In regard to claim 10, JP'774 does not mention introducing an offgas to the silane-containing feed mixture. However, recycling unused reaction products in the effluent of a reaction apparatus back into a reaction apparatus is routine practice in the chemical art, and thus it would have been obvious to one of ordinary skill in the art to do so in order to avoid costly cleanup costs associated with disposing halogen compounds and in order to reduce reactant costs.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flagella '441 in view of Japan 2001-064774.

In regard to claim 1, Flagella teaches decomposing a silane containing gas to obtain silicon. Flagella teaches that a silane gas can be silane (monosilane) and halosilane containing. See column 4, lines 1-58 and claims 16-23. Flagella does not teach a specific gas mixture of monosilane and monochlorosilane. However, it would have been obvious to one of ordinary skill in the art to modify Flagella in view of JP'774. JP'774 teaches adding monochlorosilane to a silane mixture used to produce silicon. See abstract. One of ordinary skill in the art would have been motivated to make such a modification in order to produce pure silicon at a high speed while avoiding powder formation. See PAJ abstract and [0037] of the provided machine translation.

In regard to claim 2, JP'774 teaches a range of molar ratio of monosilane to monochlorosilane of 1:99 to 95:5. Overlapping ranges are *prima facie* obviousness. See MPEP 2144.05.

In regard to claim 3, JP'774 teaches that the reactive gas mixture can further comprise dichlorosilane or trichlorosilane. See [0021] of the provided machine translation.

In regard to claim 4, JP'774 teaches that the gas mixture can be obtained from trichlorosilane as required by the claim. See [0031]-[0034]. Furthermore, this process is well known as admitted by applicant spanning instant pages 3-4.

In regard to claim 5, Flagella teaches a temperature of 550-1000°C. See column 5, lines 38-41. Overlapping ranges are *prima facie* obviousness. See MPEP 2144.05.

In regard to claim 6, Flagella is silent in regard to the pressure. However, in the chemical art, it is routine practice to use standard pressure (which falls within the range of the claim) unless otherwise specified.

In regard to claim 7, the references do not mention the process being continuous; however, making a batch process continuous would have been obvious to one of ordinary skill in the art. See MPEP 2144.04 Section V.

In regard to claim 8, JP'774 teaches storing the gas mixture in a cylinder as a gas or liquid (that is connected to the decomposition/deposition apparatus). See [0025].

In regard to claim 9, JP'774 teaches that hydrogen, nitrogen, or argon (a noble gas) can be included in the reaction gas. Though JP'774 is silent in regard to mixing these gasses with the silanes prior to introduction to the decomposition/deposition apparatus; it would have been obvious for one of ordinary skill in the art to do so as JP'774 mentions that these gasses may be contained in the "raw material," see [0021], (i.e. the mixture of reaction gasses before introduction into the reaction chamber) and

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thus it would have been obvious to one of ordinary skill in the art to mix the hydrogen, nitrogen, or argon with the silanes in order to achieve such a "raw material" mixture.

In regard to claim 10, Flagella teaches recycling hydrogen (an offgas) as an inert carrier gas within the system. See column 4, lines 51-53.

In regard to claim 11, Flagella teaches a fluidized bed reactor using solid silicon seeds (pieces). See column 4, lines 4-26.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Herrick '219 teaches producing silicon from halosilane/silane mixtures see claims and Tables.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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ajz

/Steven Bos/

Primary Examiner, Art Unit 1793